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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 16

Application Number: 09/512,949
Filing Date: February 25, 2000
Appellant(s): CHA ET AL.

John L. Rogitz, Reg. No. 33,549
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 3, 2002.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences, which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of claims

Appellant's brief includes a statement that claims 1-24 stand or fall together as set forth in 37CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

US Patent 6,263,334	Fayyad et al.	July 17, 2001
	Filing date	November 11, 1998
US Patent 5,619,717	Staats	April 8, 1997
Apple Computer paper	Apple Computer	July 7, 1996

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-24 are rejected under 35 U.S.C. 112 first paragraph. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fayyad et al. (US Patent 6,263,334) and in view of Staats (US Patent 5,619,717) and further in view of "Converting Between Cartesian and Polar Coordinates", (Apple Computers, Inc. 1996). This rejection is set forth in prior Office Action, Paper No. 5.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

   The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The analysis under 35 U.S.C. 112, first paragraph, requires that the scope of protection sought be supported by the specification disclosure. The pertinent inquiries include determining (1) whether the subject matter defined in the claims is described in the specification and (2) whether the specification disclosure as a whole is to enable one skilled in the art to make and use the claimed invention.

2. Claims 1-24 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The enablement requirement necessitates a determination that the disclosure contains sufficient teaching regarding the subject matter claimed as to enable one skilled in the pertinent art to make and use the claimed invention. In essence, the scope of enablement provided to one ordinarily skilled in the art by the disclosure must be commensurate with the scope of protection sought by the claims.

Currently, the most prevalent standard for measuring sufficient enablement to meet the requirements of 112 is that of "undue experimentation". The test is whether, at the time of the invention, there was sufficient working procedure for one skilled in the art to practice the claimed invention without undue experimentation. It is important to note that the test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, is it undue. A skilled artisan is given sufficient direction or guidance in the disclosure. Moreover, the experimentation required, in addition to not being undue, must not require ingenuity beyond that expect of one of ordinary skill in the art.

Undue experimentation and ingenuity would be required beyond one ordinarily skilled in the art to practice:

1) "dimensionality of 'd' " in claims 3, 8, 11 and 13;

2) " dmin1 < k-NNdist (q) " at claim 13;

3) "approximations " at claims 1, 8,15.

These approximations are based on the formula/expression or variable "K-NN_{dist}". Thus, Approximation would cause undue experimentation.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> "A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

4. Claims 1-4, 8-12, 15-18, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fayyad et al. (US Patent 6,263,334) as applied to claims above, and further in view of "Converting Between Cartesian and Polar Coordinates", (Apple Computers, Inc. 1996).

5. As per independent claims 1, 8 and 15, Fayyad rendered by the following:

"for at least some data vectors in a data space, generating respective approximations in polar coordinates." Approximation is interpreted as probability function at Figs. 7 & 8, col. 7, lines 55-67 to col. 8, lines 1-14.

"based on the approximations, returning "k" nearest neighbors to the query." at Figs. 2B, col. 4, lines 55-67 to col. 5, lines 1-3.

Fayyad does not teach explicitly polar coordinates. However, Apple computer,Inc. teaches converting Cartesian to Polar coordinates. Thus, it would have been obvious to one ordinarily skilled in the art at the time of the invention to convert Cartesian to Polar coordinates. It is an easy, simple and popular method of converting between Cartesian and Polar Coordinates.

6. As per dependent claims 2, 10 and 16, Fayyad rendered by the following:

"dividing the data space into plural cells" at Fig. 3A, col. 5, lines 4-8;

"representing at least one data point in at least one cell in polar coordinates with respect to the at least one cell." at Fig. 3B, col. 5, lines 19-31;

7. As per dependent claims 3, 11 and 17, Fayyad rendered by the following:

"determining a number of "b" bits to be assigned to each cell." at Fig. 4D, col. 7, lines 1-17;

"dividing the data space into 2bd cells." at Fig. 4D, col. 7, lines 23-36.

8. As per dependent claims 4 and 18, Fayyad rendered "generating a candidate set of approximations based at least on the lower bounds dmin of the approximations" at Fig. 9A, col. 12, lines 46-54.

9. As per dependent claim 9, Fayyad rendered "the means for generating generates respective approximations of data vectors p in local polar coordinates." at Fig. 2, col. 8, lines 35-43.

10. As per dependent claim 12, Fayyad rendered "computer readable code means for generating a candidate set of approximations based at least on the lower bounds dmin and upper bounds dmax of the approximations. at Fig. 9A, col. 12, lines 46-59.

16.As per dependent claims 22, 23 and 24, Fayyad rendered "generating a candidate set of approximations based at least on the upper bounds dmax of the approximations." at Fig. 9A, col. 13, lines 7-10.

11. Claims 5-7, 13-14, 19-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Fayyad et al. (US Patent 6,263,334) in view of "Converting Between Cartesian and Polar Coordinates", (Apple Computers, Inc. 1996) as applied to claims above, and further in view of Staats (US Patent 5,619,717).

12. As per claims 5, 13 and 19, "adding a first approximation having a first lower bound dmin1 to the candidate set if dmin1 < k-NNdist (q), wherein k-NNdist (q) is the kth largest distance between the query vector q and nearest neighbor vectors p." Fayyad and Apple Computers does not teach explicitly using vectors in nearest neighbor search. However, Staats teaches for determining the nearest neighbor of a data vector. (Figs. 2 & 4, col. 6, lines 62-67 to col. 7, lines 1-36). Thus, it would have been obvious to one ordinarily skilled in the art at the time of the invention decide to use a technique of finding the nearest neighbor of a data vector without searching all .

quantized vectors in a codebook. Staats technique accelerates the efficiency of vector quantization.

13. As per dependent claims 6, 14 and 20, Staats teaches "using the candidate set to return "k" nearest neighbors vectors p to the query vector q." at Figs. 5, col. 8, lines 62-67.

14. As per dependent claims 7 and 21, Staats teaches "not all vectors p corresponding to approximations in the candidate set are examined to return the 'k' nearest neighbors." at Figs. 5, col. 9, lines 1-4.

(11) Response to Arguments

The Examiner respectfully traverses Appellant's argument regarding Prior Arts of Fayyad et al. (US Patent 6,263,334), Staats (US Patent 5,619,717) and "Converting Between Cartesian and Polar Coordinates", (Apple Computers, Inc. 1996).

A. Response to Appellant's Argument Regarding Claims 1-4, 8-12, 15-18, and 22-24, That Fayyad et al., Staats and Apple Computers Paper Fails to Disclose "Polar Coordinates."

Appellant's specification addresses the problem associated with implementing queries for nearest neighbor in high dimensional data spaces using "polar coordinates". Polar coordinate system is used for shapes that have symmetry about a point. Polar coordinate system deals with a radius and an angle, (used to draw circles) (see Apple computer,Inc. teaches converting Cartesian to Polar coordinates). Cartesian

coordinates system is well known and used on computer screens to draw all graphics. In order to draw polar coordinates on computer screen, it is well known that the coordinates have to be converted into Cartesian coordinates and the formulas used are:

X Coordinate = Cosine(angle) * radius

Y Coordinate = Sine(angle) * radius

The invention deals with computers in querying a database for nearest-neighbor using polar coordinates.

B. Response to Appellant's argument of "Why the prior art motivates one to convert or change Fayyad et al.'s Cartesian system to polar. Indeed, no proffer of why a reasonable expectation of success exists in converting Fayyad et al.'s invention to polar has been made. As it is simply converting Fayyad et al.'s Cartesian system to polar would destroy the efficacy of its equations to execute nearest neighbor searches."

The claimed invention is the same as prior art except using a different coordinate system (see Fayyad at Figs. 7 & 8, col. 7, lines 55-67 to col. 8, lines 1-14 and Figs. 2B, col. 4, lines 55-67 to col. 5, lines 1-3) and in order to achieve in the required (appellant's) polar coordinate system a well-known conversion method is suggested (see at Apple computer, Inc. teaches converting Cartesian to Polar coordinates).

C. Response to Appellant's argument of "dimensionality d, dmin1 < k-NNdist(q), approximation and k-Nndist does not lack enabling disclosure."

When the specification is not documented properly, a person of skilled in art will not understand the invention details even after reading several times. Appellant did not explain the notations before or after an equation, dmin1 < k-NNdist(q) on page 9, line 7 of the specification. The " – " in K-NNdist(q) typically means subtraction operation. However, in this case, it is unclear if this is an operation or should be treated as a single variable regardless of common characters with common arithmetic operation. Thus, it is confusing to read and lack proper disclosure. How should an artesian who be able to evaluate without undue experimentation? The totality of the specification simply lacks proper enabling disclosure.

The variable, dmin1 is not enabled in the specification as well. The only the mention of this variable is page 4, line 5 of the specification. This causes a skilled artesian to be burdened with undue experimentation.

(12) Conclusion

The claimed invention is available in the prior art with a difference in coordinate system. A simple conversion method into inventor used polar system is also prior art. In addition to this, the invention lacks proper documentation in the specification and lot of questions arise to a person of ordinarily skilled in the art for implementing the invention in the real world.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Examiner
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srp
February 10, 2003

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